FARM FACTS

Crop Planning Guide 2001

Brown Soil Zone

Produced by Saskatchewan Agriculture and Food

The following information is intended to act as a **guide** for crop planning. These estimates **do not** represent provincial average cost of production figures.

The writers of this publication have made a number of assumptions that may not apply to individual farm operations. On each farm, costs and yields differ due to soil type, climatic conditions and agronomic practices. Farm managers should determine their **own** costs, yields and expected commodity prices and adjust or change the assumptions listed on the back of this publication.

The crop budgets are intended to serve as a guide to estimate the income and cost for different crops on summer fallow and stubble. This publication includes budgets for crops seeded on fallow and stubble land using conventional tillage seeding practices and for crops seeded on stubble land using direct seeding.

The figures provide an estimate of variable expenses, other expenses (machinery and building investment cost and depreciation and land investment cost). The grain prices are farmgate price estimates for 2001 crop production based on the information that is available at this time (December 2000).

Large variations in yields and costs do exist between producers. Therefore, these budgeting figures should be used as a guide to develop estimates for your own farm. Your past farm records adjusted for expected changes in 2001 can be used to develop your own budgeting figures. Blank worksheets are provided for this purpose.

These crop budgets can be used to assist producers in deciding which crops will be the most profitable for the coming year (short-run decisions) or in deciding which crop rotations and farming practices may be the most profitable for the farm (long-run decisions).

Short-run decisions such as deciding which crops to grow this coming year can be made by comparing **return over variable expenses** (Estimated Gross Revenue minus Variable Expenses). Deciding which crop to grow in any one year must also take into account a number of production factors. A FarmFact publication, *Cropping Decisions*, is available from Saskatchewan Agriculture and Food Rural Service Centers. This publication identifies a number of other issues that need to be considered in deciding which crop to grow this coming year.

When looking at long-run decisions such as crop rotations, direct seeding and continuous cropping, you must look at all costs, including fixed costs. The return over total expenses should be the basis of comparison between alternatives.

Switching to a longer crop rotation or direct seeding and/or continuous cropping will likely require a change in farm machinery. Before making these changes, the return over all costs need to be considered.

When comparing continuous stubble crop to a fallow seeded crop returns per acre you must add the summer fallow costs to the fallow seeded crop expenses. The best way of comparing summer fallow and stubble crops is to calculate the average returns per rotation acre for different rotations of crops. Refer to the example in this guide.

The break even yields per acre show the level of yields producers would need to achieve to cover costs in 2001, based on the estimated market price.

The break even prices for crops show the levels of prices needed by producers to cover costs in 2001, if the estimated average yields are obtained.

The net returns and break even prices and yields in this report are very sensitive to the estimated yields and prices used. Farm managers are advised to interpret these figures very carefully and evaluate new information as it becomes available. Using management tools such as crop insurance and forward pricing reduce the risk of fluctuations in these factors.

CROP PRODUCTION COSTS ($/ACRE) BROWN SOIL ZONE 2001

	Summerfallow		Fallow Seeded Crops				
	Tillage Fallow	Chem Fallow	Spring Wheat	Durum Wheat	CPS Wheat	Feed Barley	Oats
REVENUE PER ACRE							
Estimated Yield (bu/ac,lb/ac) (A)			31.6	32.6	41.7	51.1	53.3
Est. On Farm Market Price/bus,lb (B)			4.25	4.25	3.40	2.00	1.50
Estimated Gross Revenue/ac (AxB) (C)	**0.00**	**0.00**	**134.30**	**138.55**	**141.78**	**102.20**	**79.95**
EXPENSES PER ACRE							
Variable Expenses/acre							
Seed			6.73	8.15	6.46	5.52	5.34
Fertilizer* - Nitrogen			6.00	6.00	6.00	6.00	6.00
- Phosphorus			5.20	5.20	5.20	5.20	5.20
- Sulfur & Other			0.00	0.00	0.00	0.00	0.00
Chemical - Herbicides	2.50	14.46	10.91	10.91	10.91	10.91	7.32
- Insecticides/Fungicides			0.98	0.98	0.98	0.00	0.00
- Others			1.73	1.95	1.95	1.80	1.70
Machinery Operating - Fuel	5.00	1.00	8.50	8.50	8.50	8.50	8.50
- Repair	2.10	1.50	6.00	6.00	6.00	6.00	6.00
Custom Work & Hired Labour	0.00	0.00	5.00	5.00	5.00	4.00	4.00
Crop Insurance Premium			1.69	2.09	2.65	2.54	1.72
Utilities & Miscellaneous	2.57	2.57	2.57	2.57	2.57	2.57	2.57
Interest on Variable Expenses	1.37	2.20	2.07	2.15	2.11	1.99	1.81
Total Variable Expenses (D)	**13.54**	**21.73**	**57.37**	**59.50**	**58.33**	**55.03**	**50.16**
Other Expenses/acre							
Building Repair	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Property Taxes	3.97	3.97	3.97	3.97	3.97	3.97	3.97
Insurance & Licences	1.12	1.12	1.12	1.12	1.12	1.12	1.12
Machinery Depreciation	4.20	3.00	12.00	12.00	12.00	12.00	12.00
Building Depreciation	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Machinery Investment	3.15	2.25	9.00	9.00	9.00	9.00	9.00
Building Investment	1.35	1.35	1.35	1.35	1.35	1.35	1.35
Land Investment	13.95	13.95	13.95	13.95	13.95	13.95	13.95
Total Other Expenses (E)	29.54	27.44	43.19	43.19	43.19	43.19	43.19
Labour and Management (F)**							
Total Expenses (D+E+F) (G)	**43.08**	**49.17**	**100.56**	**102.69**	**101.52**	**98.22**	**93.35**
RETURNS PER ACRE							
Return over Variable Expenses (C-D)	**-13.54**	**-21.73**	**76.93**	**79.05**	**83.45**	**47.17**	**29.79**
Return over Total Expenses (C-G)	**-43.08**	**-49.17**	**33.74**	**35.86**	**40.26**	**3.98**	**-13.40**
BREAK-EVEN YIELD PER ACRE * **							
To Cover Variable Expenses			**16.7**	**17.2**	**21.1**	**34.3**	**42.5**
To Cover Total Expenses			**33.8**	**34.3**	**42.5**	**70.7**	**91.0**
BREAK-EVEN PRICE PER BUS/LB * **							
To Cover Variable Expenses			**2.24**	**2.24**	**1.72**	**1.34**	**1.20**
To Cover Total Expenses			**4.55**	**4.47**	**3.47**	**2.77**	**2.56**

***Fertilizer prices as of December 1/00. Rising natural gas prices over the course of the winter will equate into higher fertilizer prices by spring especially nitrogen fertilizer. Producers should take this into account when using these guides.**

**** These budgets do not include an estimate for owner/operator labour and management. This value varies greatly and depends on both the farm manager's needs as well as the ability of the farm business to generate income. Farm managers need to determine their own actual labour and management cost and add it to total expenses.**

***** The break-even yields and prices for summerfallow crops include the previous years tillage fallow expenses.**

				Conventional Seeded Stubble Crops						
Flax	Lentil	Canary Seed	Mustard	Spring Wheat	Durum Wheat	CPS Wheat	Feed Barley	Oats	Flax	Lentil
17.2	1157.4	939.0	18.4	21.9	22.2	25.6	35.1	39.8	12.1	886.2
5.55	**0.16**	**0.11**	**6.00**	**4.25**	**4.25**	**3.40**	**2.00**	**1.50**	**5.55**	**0.16**
95.46	**185.18**	**103.29**	**110.40**	**93.08**	**94.35**	**87.04**	**70.20**	**59.70**	**67.16**	**141.79**
4.80	18.00	4.90	2.40	6.73	8.15	6.46	5.52	5.34	4.80	18.00
6.00	**1.80**	**6.00**	**6.00**	**13.50**	**13.50**	**13.50**	**13.50**	**13.50**	**13.50**	**1.80**
5.20	6.50	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	6.50
0.00	**0.00**	**0.00**	**2.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
18.26	28.13	12.32	14.18	10.91	10.91	10.91	10.91	7.32	18.26	28.13
0.00	**2.05**	**1.15**	**0.49**	**0.98**	**0.98**	**0.98**	**0.00**	**0.00**	**0.00**	**2.05**
0.75	1.80	0.88	5.40	1.73	1.95	1.95	1.80	1.70	0.75	1.80
9.50	**9.50**	**8.50**	**9.00**	**10.00**	**10.00**	**10.00**	**10.00**	**10.00**	**11.00**	**11.00**
7.20	9.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	7.20	9.00
4.00	**3.00**	**4.00**	**3.50**	**5.00**	**5.00**	**5.00**	**4.00**	**4.00**	**4.00**	**3.00**
2.63	8.08	3.49	3.57	1.18	1.43	1.63	1.75	1.28	1.88	6.16
2.57	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**
2.28	3.39	2.06	2.26	2.39	2.46	2.41	2.30	2.13	2.59	3.38
63.20	**93.82**	**57.07**	**62.57**	**66.18**	**68.15**	**66.61**	**63.55**	**59.04**	**71.76**	**93.38**
0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
3.97	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**
1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
12.00	**15.00**	**12.00**	**12.00**	**12.00**	**12.00**	**12.00**	**12.00**	**12.00**	**12.00**	**15.00**
0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
9.00	**11.25**	**9.00**	**9.00**	**9.00**	**9.00**	**9.00**	**9.00**	**9.00**	**9.00**	**11.25**
1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
13.95	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**
43.19	48.44	43.19	43.19	43.19	43.19	43.19	43.19	43.19	43.19	48.44
106.39	**142.26**	**100.26**	**105.76**	**109.37**	**111.34**	**109.80**	**106.74**	**102.23**	**114.95**	**141.82**
32.26	**91.37**	**46.22**	**47.83**	**26.89**	**26.20**	**20.43**	**6.65**	**0.66**	**-4.60**	**48.41**
-10.93	**42.93**	**3.03**	**4.64**	**-16.30**	**-16.99**	**-22.76**	**-36.54**	**-42.53**	**-47.79**	**-0.03**
13.8	**671.0**	**641.9**	**12.7**	**15.6**	**16.0**	**19.6**	**31.8**	**39.4**	**12.9**	**583.6**
26.9	**1158.4**	**1303.1**	**24.3**	**25.7**	**26.2**	**32.3**	**53.4**	**68.2**	**20.7**	**886.4**
4.46	**0.09**	**0.08**	**4.14**	**3.02**	**3.07**	**2.60**	**1.81**	**1.48**	**5.93**	**0.11**
8.69	**0.16**	**0.15**	**8.09**	**4.99**	**5.02**	**4.29**	**3.04**	**2.57**	**9.50**	**0.16**

		Direct Seeded Stubble Crops								
Canary Seed	Mustard	Spring Wheat	Durum Wheat	CPS Wheat	Feed Barley	Oats	Flax	Lentil	Canary Seed	Mustard
589.8	15.3	21.9	22.2	25.6	35.1	39.8	12.1	886.2	589.8	15.3
0.11	**6.00**	**4.25**	**4.25**	**3.40**	**2.00**	**1.50**	**5.55**	**0.16**	**0.11**	**6.00**
64.88	**91.80**	**93.08**	**94.35**	**87.04**	**70.20**	**59.70**	**67.16**	**141.79**	**64.88**	**91.80**
4.90	2.40	6.73	8.15	6.46	5.52	5.34	4.80	18.00	4.90	2.40
13.50	**13.50**	**13.50**	**13.50**	**13.50**	**13.50**	**13.50**	**13.50**	**1.80**	**13.50**	**13.50**
5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	6.50	5.20	5.20
0.00	**2.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.00**
12.32	14.18	15.41	15.41	15.41	15.41	11.82	22.76	32.63	16.82	14.58
1.15	**0.49**	**0.98**	**0.98**	**0.98**	**0.00**	**0.00**	**0.00**	**2.05**	**1.15**	**0.49**
0.88	5.40	1.73	1.95	1.95	1.80	1.70	0.75	1.80	0.88	5.40
10.00	**10.50**	**7.00**	**7.00**	**7.00**	**7.00**	**7.00**	**8.00**	**8.00**	**7.00**	**7.50**
6.00	6.00	5.00	5.00	5.00	5.00	5.00	6.00	7.80	5.00	5.00
4.00	**3.50**	**5.00**	**5.00**	**5.00**	**4.00**	**4.00**	**4.00**	**3.00**	**4.00**	**3.50**
2.18	2.41	1.18	1.43	1.63	1.75	1.28	1.88	6.16	2.18	2.41
2.57	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**
2.35	2.56	2.41	2.48	2.43	2.32	2.15	2.60	3.39	2.37	2.42
65.05	**70.70**	**66.71**	**68.68**	**67.13**	**64.07**	**59.56**	**72.07**	**93.69**	**65.57**	**66.97**
0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
3.97	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**	**3.97**
1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
12.00	**12.00**	**10.00**	**10.00**	**10.00**	**10.00**	**10.00**	**10.00**	**13.00**	**10.00**	**10.00**
0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
9.00	**9.00**	**7.50**	**7.50**	**7.50**	**7.50**	**7.50**	**7.50**	**9.75**	**7.50**	**7.50**
1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
13.95	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**	**13.95**
43.19	43.19	39.69	39.69	39.69	39.69	39.69	39.69	44.94	39.69	39.69
108.24	**113.89**	**106.40**	**108.37**	**106.82**	**103.76**	**99.25**	**111.76**	**138.63**	**105.26**	**106.66**
-0.17	**21.10**	**26.37**	**25.67**	**19.91**	**6.13**	**0.14**	**-4.91**	**48.10**	**-0.69**	**24.83**
-43.36	**-22.09**	**-13.32**	**-14.02**	**-19.78**	**-33.56**	**-39.55**	**-44.60**	**3.16**	**-40.38**	**-14.86**
591.3	**11.8**	**15.7**	**16.2**	**19.7**	**32.0**	**39.7**	**13.0**	**585.6**	**596.1**	**11.2**
984.0	**19.0**	**25.0**	**25.5**	**31.4**	**51.9**	**66.2**	**20.1**	**866.4**	**956.9**	**17.8**
0.11	**4.62**	**3.05**	**3.09**	**2.62**	**1.83**	**1.50**	**5.96**	**0.11**	**0.11**	**4.38**
0.18	**7.44**	**4.86**	**4.88**	**4.17**	**2.96**	**2.49**	**9.24**	**0.16**	**0.18**	**6.97**

Using the Crop Budgets

The relative profitability of crops can be difficult to determine when they are part of a longer-term rotation. Profits are easier to compare based on the net returns per rotation acre, which is the average profit or loss per acre, per year for a particular crop rotation.

Step 1. Adjust the Crop Budgets for the Crops to be Compared.

The crop budgets shown in this report are based on estimated costs and returns for each crop. The actual costs and returns on your own farm may be different. For example, the budget for direct seeded stubble mustard assumes the use of a herbicide to control grassy weeds and volunteer grain. You may not have these weeds on the fields you are planning to seed. You may wish to change costs to suit the conditions on your own farm.

The assumptions which were used to develop the budgets are listed on the back of this report. A blank worksheet is provided to permit you to adjust the budgets for each crop in the rotations you are comparing.

Step 2. Calculate the Average Returns per Rotation Acre.

Use the table below to list the different rotations of crops and fallow which you are considering for your farm. Show the complete rotation from the first year to the last year. Use the adjusted crop budgets for your own farm to calculate the average return per rotation acre for various rotations.

Crop Rotation Returns

	Example 1			Rotation 1		Rotation 2		Rotation 3	
	Crop	Return over Total Expenses $/acre	Return over Variable Expenses $/acre	Crop	Return $/acre	Crop	Return $/acre	Crop	Return $/acre
Year 1	Lentil on Fallow	$42.93	$91.37						
Year 2	Wheat Direct-Seeded	($13.32)	$26.37						
Year 3	Chem fallow	($49.17)	($21.73)						
Year 4									
Year 5									
Year 6									
Total Returns		($19.56)	$96.01						
Total no. years in rotation		3	3						
Return per rotation acre		($6.52)	$32.00						

In this example, both returns over total expenses and returns over variable expenses are calculated. If the average return is negative then the rotation with the smallest negative return would be best.

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Assumptions
Brown Soil Zone

1. **Seed including cleaning:**
   - Spring wheat 1.15 bu/ac at $5.85/bu
   - Durum wheat 1.3 bu/ac at $6.27/bu
   - CPS wheat 1.3 bu/ac at $4.97/bu
   - Barley 1.5 bu/ac at $3.68/bu
   - Oats 2 bu/ac at $2.67/bu
   - Mustard 10 lb/ac at $0.24/lb
   - Flax 30 lb/ac at $8.75/bu ($.16/lb)
   - Lentils 90 lb/ac at $0.20/lb
   - Canary seed 35 lb/ac at $0.14/lb
   - Seed prices are an average of seed grower price and commercial prices since farmers commonly clean their own grain for seed (except for mustard).
2. **Fertilizer:**
   Nitrogen based on 46-0-0 at $308/tonne ($.30 N/lb)
   - Nitrogen on fallow crops 20 lb N/ac
   - Nitrogen on stubble crops 45 lb N/ac
   - Nitrogen on fallow and stubble lentils 6 lb N/ac based on 50 lb of 12-51-0.

   Phosphorus based on 12-51-0 $369/tonne ($.26 P/lb)
   - Phosphorus on all crops at 20 lb P/ac except lentils where 25 lb P/ac is the rate used.

   Sulfur based on 20-0-0-24 at $243/tonne ($.20 S/lb)
   - Sulfur on mustard at 10 lb S/acre (application cost is included with machinery costs)

   Fertilizer prices as of December 1/00. Rising natural gas prices over the course of the winter will equate into higher fertilizer prices by spring especially nitrogen fertilizer. Producers should take this into account when using these guides.

3. **Chemicals**:
   Herbicides
   - Cereals: 25% of acres sprayed for wild oats (except oats) and 100% for broadleaf weeds
     Mustard fallow and conventional stubble: wild oats and broadleaf pre-plant. Mustard directseed 100% for wild oats
   - Lentils, flax: broadleaf and grassy weeds
   - Canary seed: wild oats 25%, broadleaf
   - Direct seeded stubble: preplant burn-off (glyphosate)
   - Cereals, flax, canaryseed: pre/postharvest 20% of all acres with glyphosate

   Others:
   - All crops: seed treatment or inoculation
   - Canary: insect control 20%
   - Mustard: insect control 10% crop/year (10% of $5/ac aerial application cost included in custom work)
   - Spring wheat, durum, CPS wheat: midge control 20% crop/year (20% of $5/ac aerial application cost included in custom work)
   - Lentils: inoculation, fungicide 20% crop/year, desiccation
   - Tillage fallow: winter annuals
   - Chem-fallow: winter annuals, 2 broad spectrum burn-off, 1 broad leaf

4. **Operating costs** are based on recommended production practices in the Brown Soil Zone.

5. **Fuel costs** are based on estimated fuel consumptions for the various farming operations with diesel fuel priced at 50¢ per litre.

6. **Machinery repair** rates are 6% of machinery investment per year for lentils and flax and 5% for all other crops.

7. **Saskatchewan Crop Insurance** premiums are based on coverage at 70% of Risk Area(s) average yield plus 20%.

8. **Building repair** rates are 5% of building investment per acre.

9. **Operating interest** is calculated on all cash operating costs at 7.5% for 6 months on all crops, 18 months for fallow.

10. **Machinery Depreciation** is calculated at 10% of machinery investment per year on a straight line basis.

11. **Building depreciation** is based on a building investment of $18 per cultivated acre calculated at 5% per year on a straight line basis.

12. **Average machinery investment** is $120 per cultivated acre, $42 per tillage fallow acre and $30 per chem fallow acre. An additional machinery investment of $30 per acre is assumed for lentils. Machinery investment for direct seeded crops is reduced by $20 per seeded acre.

13. **Investment cost** on building and machinery investment is calculated at an interest rate of 7.5% on the investment per acre.

14. **Land investment cost** of $13.95/ac is calculated at 4.5% return on investment of $310 per cultivated acre.

15. **Crop prices** for 2001 production are farmgate price estimates for 2001 crop production, provided by Saskatchewan Agriculture & Food in December, 2000.

16. **Crop yields** are 120% of fifteen year averages for crop insurance risk areas 3 & 10, soil class H based on data compiled by the Saskatchewan Crop Insurance Corporation. Crop yields for the average soil class in the risk area have been increased by 20% to reflect the increased productivity for 2001 over the 15 year average and the higher than average input levels used in these budgets.

17. **Crops** that appear in both the Crop Planning guides and the Alternative Crop Planner that share the same soil zone and are continuous cropped have their yields averaged between Saskatchewan Agriculture and Food's ten year averages and Saskatchewan Crop Insurance yields plus 20% values.

18. **Labour and management** - These budgets do not include an estimate for owner/operator labour and management. This value varies greatly and farm managers need to determine their own actual labour and management cost.

For more information contact: Your Extension Agrologist orMike Pylypchuk
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This information is on Saskatchewan Agriculture and Food's website along with most other publications that are produced by Saskatchewan Agriculture and Food.

Website Address:
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CROP PRODUCTION COSTS ($/ACRE) MY FARM

Use this worksheet to adjust the crop budgets for your farm costs.

Crops					
REVENUE PER ACRE					
Estimated Yield (bu/ac,lb/ac) (A)					
Est. On Farm Market Price/bus,lb (B)					
Estimated Gross Revenue/ac (AxB) (C)					
EXPENSES PER ACRE					
Variable Expenses/acre					
Seed					
Fertilizer - Nitrogen					
- Phosphorus					
- Sulfur & Other					
Chemical - Herbicides					
- Insecticides/Fungicides					
- Others					
Machinery Operating - Fuel					
- Repair					
Custom Work & Hired Labour					
Crop Insurance Premium					
Utilities & Miscellaneous					
Interest on Variable Expenses					
Total Variable Expenses (D)					
Other Expenses/acre					
Building Repair					
Property Taxes					
Insurance & Licenses					
Machinery Depreciation					
Building Depreciation					
Machinery Investment					
Building Investment					
Land Investment					
Total Other Expenses (E)					
Labour and Management (F)*					
Total Expenses (D+E+F) (G)					
RETURNS PER ACRE					
Return over Variable Expenses (C-D)					
Return over Total Expenses (C-G)					
BREAK-EVEN YIELD PER ACRE **					
To Cover Variable Expenses					
To Cover Total Expenses					
BREAK-EVEN PRICE PER BUS/LB **					
To Cover Variable Expenses					
To Cover Total Expenses					

*These budgets do not include an estimate for owner/operator labour and management. Farm managers need to determine their own actual labour and management cost and add it to total expenses.

**The break-even yields and prices for summerfallow crops should include the previous years tillage fallow expenses.

CLIMATIC SOIL ZONES OF SOUTHERN SASKATCHEWAN